FIG.1

SYSTEM CONFIGURATION

100

BACKUP MANAGEMENT SERVER

110 — **DATA PROTECTION UNIT**

111 — ENVIRONMENT INFORMATION MANAGEMENT UNIT

112 — VOLUME EVALUATION UNIT

113 — RULE CREATION UNIT

130 — RAID DISK APPARATUS OPERATION UNIT

140 — TAPE BACKUP EXECUTION UNIT

120

INTERNAL DATABASE

ENVIRONMENT INFORMATION TABLE —121

VOLUME INFORMATION TABLE —122

RULE DEFINITION TABLE —123

BACKUP DEFINITION TABLE —124

150

WORK SERVER

APPLICATION SERVICE UNIT —151

ENVIRONMENT INFORMATION COLLECTION UNIT —152

160

RAID DISK APPARATUS

170

TAPE APPARATUS

FIG.2

EXAMPLE OF OPERATION CONFIGURATION

100

BACKUP
MANAGEMENT SERVER

200

HOST A

DBMS

201

HOST B

Web SERVICE

202

RAID DISK APPARATUS

203

4 mm TAPE

204

HIGH-SPEED
STANDARD TAPE
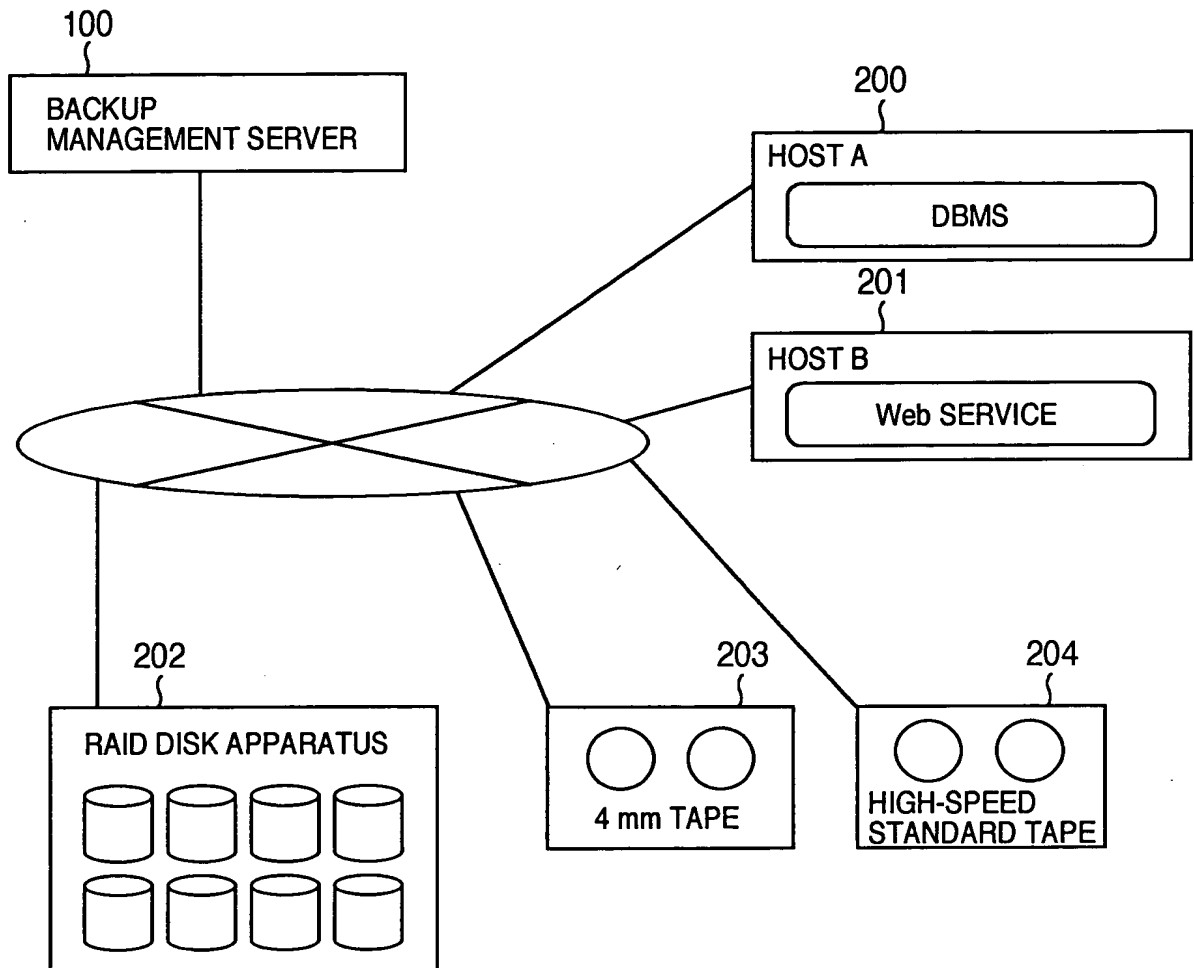
FIG.3

ENVIRONMENT INFORMATION TABLE

OBJECT ID	OBJECT TYPE	NAME	HOST NAME
A0000001	TAPE	4 mm TAPE APPARATUS	HOST A
A0000002	TAPE	HIGH-SPEED STANDARD TAPE APPARATUS	HOST B
A0000003	DataBase	DBMS	HOST A
A0000004	Service	Web SERVICE	HOST B

300   301   302   303

FIG.4

VOLUME INFORMATION TABLE

400   401   402   403   404   405   406

VOLUME ID	ACCESS			SIZE		NUMBER OF FILES
	COUNT	TYPE	INTERVAL	USE SIZE	DIFFERENCE SIZE	
V0000001	50000	Read	10sec.	50GB	0 MB	300
V0000002	100000	R/W	5sec.	30GB	0.1 MB	30000
V0000003	1	R/W	7days	20GB	1 MB	10000
V0000004	100	Write	60sec.	10GB	0.1 MB	200

407   408   409   410   411

VOLUME NAME	USER WEIGHT PARAMETER			BACKUP DEFINITION INFORMATION
	ACCESS	SIZE	NUMBER OF FILES	
/disk01/dbms	80	20	0	B0000001 B0000002
/disk02/www	100	0	0	B0000003
E :	0	20	80	B0000004
F :	0	60	40	B0000005 B0000006

FIG.5

RULE DEFINITION TABLE

500 501 502

| RULE ID | ACTION ELEMENT | CONDITION ELEMENT | | | | | |
| | BACKUP METHOD | ACCESS | | | SIZE | | NUMBER OF FILES |
		COUNT	TYPE	INTER-VAL	USE SIZE	DIFFE-RENCE SIZE	
R0000001	4 mm TAPE BACKUP	—	Read	WIDE	—	—	SMALL
R0000002	HIGH-SPEED STANDARD TAPE BACKUP (FULL)	—	Read	WIDE	LARGE	—	SMALL
R0000003	HIGH-SPEED STANDARD TAPE BACKUP (DIFFERENCE)	—	—	—	—	LARGE	—
R0000004	DISK BACKUP	—	—	—	LARGE	—	LARGE
R0000005	PLURAL-GENERATION DISK BACKUP	LARGE	R/W	—	—	—	LARGE
R0000006	MIRRORING (DISK DUPLICATION)	LARGE	R/W	NAR-ROW	—	—	LARGE

FIG.6

BACKUP DEFINITION TABLE

600 601 602 603

BACKUP DEFINITION ID	RULE ID	VOLUME ID	OBJECT ID
B0000001	R0000002	V0000001	A0000003
B0000002	R0000005	V0000001	A0000003
B0000003	R0000006	V0000002	A0000004
B0000004	R0000001	V0000003	A0000005
B0000005	R0000002	V0000004	A0000006
B0000006	R0000004	V0000004	A0000006

FIG.7

EXAMPLE OF USER WEIGHT PARAMETER INPUT

700

WEIGHT PARAMETER

| ACCESS | 80 | SIZE | 20 | NUMBER OF FILES | 0 |

701

ENVIRONMENT INFORMATION UPDATING

☐ ENVIRONMENT INFORMATION COLLECTION/
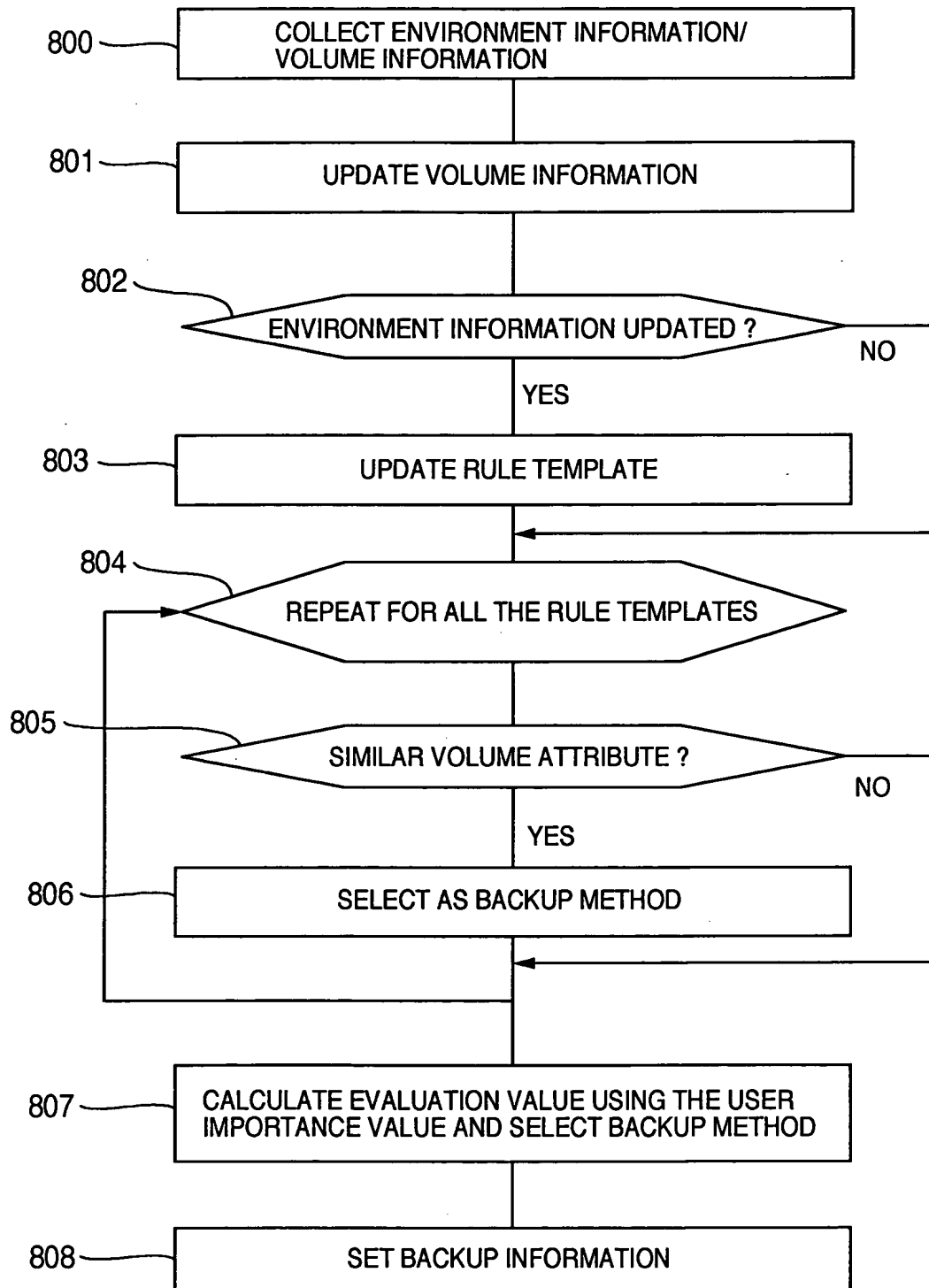EVALUATION NOT PERFORMED PERIODICALLY

☑ ENVIRONMENT INFORMATION COLLECTION/
EVALUATION PERFORMED PERIODICALLY

UPDATE INTERVAL | 1 | DAY | 0 | HOUR

OK   CANCEL

FIG.8

FLOWCHART OF BACKUP METHOD SELECTION PROCESSING

800 — COLLECT ENVIRONMENT INFORMATION/ VOLUME INFORMATION

801 — UPDATE VOLUME INFORMATION

802 — ENVIRONMENT INFORMATION UPDATED ? NO

YES

803 — UPDATE RULE TEMPLATE

804 — REPEAT FOR ALL THE RULE TEMPLATES

805 — SIMILAR VOLUME ATTRIBUTE ? NO

YES

806 — SELECT AS BACKUP METHOD

807 — CALCULATE EVALUATION VALUE USING THE USER IMPORTANCE VALUE AND SELECT BACKUP METHOD

808 — SET BACKUP INFORMATION

FIG.9

VOLUME ID	UPDATE INTERVAL	COUNTER
v0000001	1 day	3 hours
v0000002	15 hours	10 hours
v0000003	30 minutes	22 minutes
v0000004	2 hours	2 hours

900   901   902

FIG.10

INSTRUCTION INFORMATION	SELECTION CONDITION
HIGH-SPEED RESTORE	DISK
HIGH RELIABILITY	MIRRORING
⋮	⋮

1000   1001

FIG.11

DATABASE NAME	FILE NAME	VOLUME ID
System	aaa.txt	v0000001
System	bbb.txt	v0000001
⋮	⋮	⋮
temp	ccc.txt	v0000004

1100 1101 1102

FIG.12

1200 1201 1206 1202

VOLUME ID	SELECTED RULE		APPLICATION RESULT
v0000001	HIGH-SPEED STANDARD TAPE BACKUP	▼	12 minutes

1203 1204 1205

CONDITION ELEMENT		VALUE	WEIGHT PARAMETER
ACCESS	COUNT	5000	
	TYPE	Read	
	INTERVAL	10	80
SIZE	USE SIZE	50	
	DIFFERENCE SIZE	0	20
NUMBER OF FILES		300	0

FIG.13

START ——— 1300

ANY RULE OF
CONDITION SIMILAR
TO V STATE ? ——— 1301

NO

YES

SELECT BACKUP
METHOD ——— 1302

END ——— 1303

FIG.14

START ——— 1400

RULE
SELECTION REFERENCE
SPECIFIED
FOR V ? ——— 1401

NO

YES ——— 1402

EXTRACT RULE SATISFYING
SELECTION CONDITION

ANY RULE OF
CONDITION SIMILAR
TO V STATE ? ——— 1403

NO

YES

SELECT BACKUP
METHOD ——— 1404

END ——— 1405